

CLAIMS

1. A method of error detection in an inkjet printing apparatus having a printer host coupled to a print head, the method comprising the acts of:

communicating a first data stream between the printer host and the print head;

inserting a reference data stream into the first data stream; and

5 validating the first data stream based on the reference data stream.

2. The method of claim 1, wherein the first data stream comprises a serial data stream.

3. The method of claim 1, wherein the act of communicating the first data stream further comprises the act of synchronously communicating the first data stream.

10 4. The method of claim 1, further comprising the acts of:

transmitting a print head data stream comprising the first data stream and the reference data stream from the print head; and

receiving the print head data stream at the printer host.

5. The method of claim 1, wherein the act of inserting the reference data stream
15 further comprises the act of adding to the first data stream at least one of a plurality of start bits, a plurality of sync bits, a plurality of stop bits, and at least one error detection bit.

6. The method of claim 5, wherein the error detection bit comprises at least one of
20 a parity check code, residue code, "m" of "n" code, duplication code, cyclic code, arithmetic code, Berger code, Hamming code, horizontal parity code, and vertical parity code.

7. The method of claim 5, wherein the start bits, the sync bits and the stop bits have at least two bits of different voltage values.

8. The method of claim 1, further comprising the act of forming the reference data stream with a plurality of bits independent of the first data stream.

9. The method of claim 1, further comprising the act of forming the reference data stream with a non-uniform bit pattern.

5 10. The method of claim 1, further comprising the act of retrieving the first data stream stored in a print head memory.

11. A method of error detection in an inkjet printing apparatus having a printer host coupled to a print head, the method comprising the acts of:

10 synchronously receiving a data stream at the printer host from the print head;
searching for a validating data stream from the received data stream; and
validating the received data stream when the validating data stream comprises a valid data stream pattern.

12. The method of claim 11, wherein the data stream comprises a serial data stream.

13. The method of claim 11, further comprising the acts of:

15 retrieving a first data stream; and
inserting a reference data stream into the first data stream.

14. The method of claim 13, wherein the act of inserting the reference data stream comprises the acts of adding to the first data stream at least one of a plurality of start bits, a plurality of sync bits, a plurality of stop bits, and at least one error detection bit.

20 15. The method of claim 14, wherein the at least one error detection bit comprises a parity check code, residue code, "m" of "n" code, duplication code, cyclic code, arithmetic code, Berger code, Hamming code, horizontal parity code, and vertical parity code.

25 16. The method of claim 13, wherein the reference data stream has a reference pattern and, wherein the act of validating the received data stream comprises matching the reference pattern with the valid data pattern.

17. The method of claim 13, wherein inserting a reference data stream comprises the act of forming the reference data stream with a data stream independent of the first data stream.

5 18. The method of claim 11, wherein validating the received data stream comprises the act of checking the reference data stream for a non-uniform bit pattern.

19. The method of claim 11, further comprising the act of retrieving the data stream stored in a print head memory.

20. A data error detection system on an inkjet print head coupled to a host, the data error detection system comprising:

10 a print head communication link coupling the print head and the host, and configured to communicate a first data stream between the print head and the host;

a data stream register coupled to the print head, and configured to insert a reference data stream into the first data stream; and

15 a data validating controller coupled to the host, and configured to validate the first data stream based on the reference data stream.

21. The data error detection system of claim 20, wherein the first data stream comprises a serial data stream.

22. The data error detection system of claim 20, wherein the print head communication link communicates the first data stream synchronously.

20 23. The data error detection system of claim 20, wherein the data stream register adds at least one of a plurality of start bits, a plurality of sync bits, a plurality of stop bits, and at least one error detection bit to the first data stream.

24. The data error detection system of claim 23, wherein the at least one error detection bit comprises a parity check code, residue code, "m" of "n" code, duplication code, cyclic code, arithmetic code, Berger code, Hamming code, horizontal parity code, and vertical parity code.

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25. The data error detection system of claim 20, the inkjet print head retrieves the first data stream from a print head memory.

26. The data error detection system of claim 20, wherein the data stream register forms the reference data stream with a non-uniform bit pattern.

5 27. The data error detection system of claim 20, wherein the data stream register forms the reference data stream with a data stream independent of the first data stream.

28. An inkjet printing apparatus comprising:

a print head configured to synchronously transmit a data stream; and

10 a print controller adapted to be coupled to the print head, and configured to search for a validating data stream from the transmitted data stream, and to validate the received data stream when the validating data stream comprises a valid data stream pattern.

29. The inkjet printing apparatus of claim 28, wherein the data stream comprises a serial data stream.

15 30. The inkjet printing apparatus of claim 28, wherein the print controller receives data streams from the print head.

31. The inkjet printing apparatus of claim 28, wherein the print head retrieves a first data stream from a print head memory.

20 32. The inkjet printing apparatus of claim 28, wherein the print head inserts a reference data stream into the first data stream.

33. The inkjet printing apparatus of claim 32, wherein the print head adds to the first data stream at least one of a plurality of start bits, a plurality of sync bits, a plurality of stop bits, and at least one error detection bit.

25 34. The inkjet printing apparatus of claim 33, wherein the at least one error detection bit comprises a parity check code, residue code, "m" of "n" code, duplication code, cyclic code, arithmetic code, Berger code, Hamming code, horizontal parity code, and vertical parity code.

35. The inkjet printing apparatus of claim 32, wherein the reference data stream has a reference pattern, and wherein the print controller compares the reference pattern with the valid data pattern.

5 36. The inkjet printing apparatus of claim 32, wherein the print head forms the reference data stream with a non-uniform bit pattern.

37. The inkjet printing apparatus of claim 32, wherein the print head forms the reference data stream with a data stream independent of the first data stream.

10 38. A print head adapted to be used in a printing apparatus, to be coupled to a host, and to store a first data stream in a memory, the print head comprising a data stream module adapted to retrieve the first data stream from the memory, to insert a reference data stream into the first data stream thereby forming a transmit data stream, and to transmit the transmit data stream to the host, so that the host, upon receiving a data stream, can validate the received data stream if the received data stream comprises the transmit data stream with the inserted reference data stream.

15 39. The print head of claim 38, and wherein the data stream module comprises a data stream register adapted to insert the reference data stream.

40. The print head of claim 38, and wherein the reference data stream comprises a non-uniform bit pattern.

20 41. The print head of claim 38, and wherein the reference data stream comprises at least one of a plurality of start bits, a plurality of sync bits, a plurality of stop bits, and at least one error detection bit.

25 42. The print head of claim 41, and wherein the at least one error detection bit comprises a parity check code, residue code, "m" of "n" code, duplication code, cyclic code, arithmetic code, Berger code, Hamming code, horizontal parity code, and vertical parity code.

43. The print head of claim 38, and wherein the reference data stream comprises a data stream independent of the first data stream.

44. The print head of claim 38, and wherein the reference data stream comprises a serial data stream.

45. The print head of claim 38, and wherein the print head communicates the first data stream synchronously.